

SMART PUBLIC DISTRIBUTION SYSTEM USING AVR MICROCONTROLLER

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ABSTRACT

The system of providing basic domestic commodities on subsidy to poor families in developing countries like India is a vital aspect to satisfy basic requirement of citizens. The existing public allocation system in Ration shops wants manual measurement of quantity and maintenance of record of transactions. Several issues are encountered by the existing system like, 1. Ration allocation to unauthenticated card holders. 2. Card holders wasting time in queues for collecting ration items for hours. 3. Many malpractices like signing, black marketing and overcharging. 4. Human intervention in updating transactions and maintenance of records in ledger is not easy. Our project focuses on design and accomplishment of automation of Public distribution system. The planned idea is to replace the manual work in public distribution system. The ration allocation system is computerized by exploitation AVR Microcontroller. During this computerized ration system replaces the conservative ration card system via smart card. Additionally, the RFID Card detector is swapped in the machine so as to check the correct consumer access. If the consumer is correct consumer, the following process takes place and also the input will be given in the Laptop. As soon as the input is given, the products are obtained from the computerized ration shop and the amount is taken from the bank account of the particular person. The embedded controller is preprogrammed in such a way to execute the similar operations. In this computerized ration shop government have control over all transaction that occurs in ration shop. In order to involve government in the procedure, the planned ration shop system is linked to the government database via GSM modules, which further sends the up-to-date information to the government and the consumer.

KEYWORDS: AVR Microcontroller, GSM modules, RFID reader, ration shop, smart card, consumer

INTRODUCTION

Government provides food, oil and fuel to economically challenged citizens at subsidized rates which are distributed to the public through ration shops. The stocks for these ration shops will be bought from the farmers and after that sold at subsidized rates. Monthly fresh stock arrives at these shops and which wants to be distributed to public. The majority owner of the ration shops resort to malpractices and the allotted amount of ration isn't distributed to authorized citizens. To defy these dishonorable activities this system is developed, that contains the following features: 1. Fingerprint authentication system used to determine a specific consumer creating the system secure. 2. The commodity and it's quantity will be chosen using android application. 3. Predefined information concerning the amount of ration to be distributed. 4. Automated ration distributing mechanism. Public

allocation system in the country has undergone organic changes from the rationing system introduced in the period of World War II to a vital social safety program to confirm food security of the country. Under the public distribution System (PDS), the central government procures and provides special essential commodities to reasonable cost at rigid central issue prices. In the earlier period, a number of things like iodized salt, palm oil, candles, ghee, cloth etc. have been distributed through the PDS, however at present department of food and supplies have confined the reasonable cost allocation to only some cereals, wheat, rice, sugar and kerosene oil. Nowadays, India has 4,78,000 ration stores in service across a lot of localities, villages, towns and cities in the country making it the biggest allocation set-up in the world. Department of food and supplies is providing ration cards to the citizens based on their financial circumstances. There are commonly 2 types of cards: First one is Below poverty line (BPL) cards and second one is Above poverty line (APL) cards. Smart public distribution system 2016-17 Against the important commodities act there are many deceitful activities going on unreasonable cost shops. Users are enforced to wait in long queues for hours together to buy the essential commodities. Card holders and their family member's details are stored in a notebook. Hence each time transaction is made by the card holder, entry had to be prepared manually in the book. Maintenance of documentation in book is difficult. Therefore, an efficient and computerized system is mandatory to diminish the misappropriations. Quantity of ration to be provided for these cards is fixed based on the number of members in the card holder's family. The Department of food and supplies enforces control over these requirements under the orders by the Essential Commodities Act, 1955 regulating trade in particular essential commodities by keeping a close observation on stocks, passageway, quality and availability of those commodities. Enforcement consists of collection of information and proof of contravention of provisions of the related control orders and action taken against them under the provisions of Essential Commodities Act.

OBJECTIVES

In this system we are using GSM is used to provide the details of the commodities dispatched to consumer as well as government officials. We are using the basic level of security which is a RFID card with a particular or unique number issued by government to all citizens.

LITERATURE SURVEY

Evolution of public allocation of basic commodities in India had its origin in the rationing system introduced by the British in the duration of the World War II. This system was started in 1939 in Bombay city and step by step extended to further cities and towns. By the end of 1943, 13 cities had been brought under the coverage of rationing and around 771 cities or towns were covered in 1946. Several rural areas, suffering from chronic shortage were also covered. While there PDS is following the same pattern. There are only small alteration is happening in the field of PDS.

PRECEDING WORK ON SMART PDS

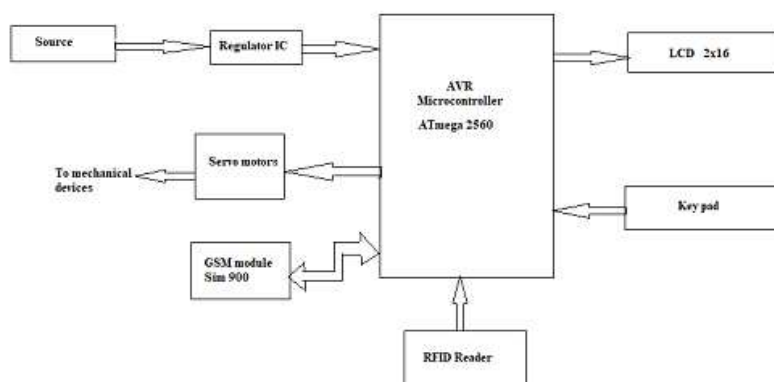
At first the consumer is asked to swipe the RFID card. The Raspberry pi compares the unique tag ID with the data base. If the tag ID matches, the consumer is asked to scan the finger. Once the consumer identity is authenticated, the commodity and quantity will be chosen through voice commands. If the commodity and quantity are valid, the system dispenses the valid commodity. A message is sent to the consumer giving the details of the transaction. However, if the authentication fails the system waits for valid authentication [1]. Sana et.al [2] presents a transparent and highly scalable Ration Distribution system with biometric authentication. The conservative paper based ration card is replaced by smart card. The system is linked to the server through web. All time before ration collection each consumer has to login into the system. The consumer should not to pay the cash money as the appropriate balance is deducted from consumers bank account, thus there is no direct involvement of ration

shop owner in transaction. The transaction details are send to consumers mobile. Bhalekar et.al [3], this paper proposes online smart ration card system using RFID and biometrics. RFID tag will contain the information about family members. RFID tag given to a particular customer must show to the RFID reader. It can check whether the card is valid or not and if yes, then by using biometrics the customer authentication is performed. If the customer is authenticated then the monthly quota will get displayed according to the family members. Once delivery of ration, records are maintained in the online database. Ashok Kumar et.al [4], a Comparative Study on Fingerprint Matching Algorithms for EVM. The 3 matching techniques are direct matching, minutiae matching and matching based 3 IOT based Smart public distribution system 2016-17 on Ratios of distance. By conducting the evaluation on the FVC-2000 datasets and the results were observed by conducting election with the help of these matching techniques and the best matching technique is found. Sharath et.al [5], this paper address the problem of fingerprint uniqueness by quantifying the amount of information available in minutiae features to begin a correspondence between 2 fingerprint images.

PRECEDING WORK ON FINGERPRINT IDENTIFICATION SYSTEM

Fingerprint processing includes 2 steps: fingerprint enrollment and matching. At the time of enrollment, consumer must provide 2 samples of his/her fingerprint. Using these 2 samples of fingerprint images, the system generates a template of the fingerprint which is used to authenticate the consumer later. The generated template of the fingerprint is compared with the templates of the finger records. System will return the matching result as success or failure. This fingerprint comparison is done in the controller via an algorithm for identical of fingerprints [6]. There are lots of techniques offered previously based on fingerprint matching techniques. The majority of the techniques undertaken in previous researches are based on the biometric authentication like fingerprint. Fuzzy vault system is one of the most vital mechanisms for secure biometric authentication based on fingerprint minutiae in which a secret key is produced, selecting chaff points from minutiae template. Fingerprint matching using a Gabor filter is one more technique which uses fingerprint matching using a 16 Gabor filter from the template which results in designing a new process. It compares 2 ridge pattern maps of images using adaptive filter method. Several techniques are already exist for improvement of fingerprint images which are based on image normalization, Gabor filtering (Hongs algorithm) and Binarization method. Common fingerprint matching algorithms are based on the Direct matching, Minutiae based matching and also the Ratio of relational distance matching.

BLOCK DIAGRAM



BLOCK DIAGRAM OF SMART PUBLIC DISTRIBUTION SYSTEM

BLOCK SPECIFICATIONS

GSM Module

- GSM could be a digital mobile telecom system. GSM digitizes and compresses data, then sends it down a channel with 2 further streams of consumer data, every in its own time slot.
- It operates at whichever the 900 MHz or 1800 MHz frequency band.
- The GSM module is communicate the microcontroller with mobile phones through UART.
- To communicate over UART or USART, we simply want 3 fundamental signals that are namely, RXD (receive), TXD (transmit) & GND (common ground).
- GSM modem interfacing with microcontroller for SMS control of industrialized equipments.



RFID Reader: Once a consumer swipes the RFID card, and provides the password to the system, it is a RFID card reader which detects and reads the RFID Tag and forwards the details to the interfaced microcontroller module.



Servo Motor: A servo motor is an electrical device which may push or rotate an object with enormous accuracy. It's just prepared up of simple motor that run through servo system



Regulator Ic: Regulator that restricts the production voltage to 5v production for a variety of ranges of input voltage.

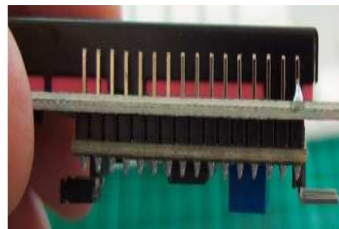


Liquid Crvstal Display with i2c Serial Interface Adaptor Module: By LCD modules among Arduino is popular, but the quantity of wiring needs time and endurance to wire it up properly - and furthermore uses a lot of digital output pins. So that we love these - serial backpack modules they're built-in to the back of your LCD module and allows link to Arduino (or further

development board) among just 4 wires - power, GND, data and clock

Specifications of i2c:

- Provide voltage: 5V
- Back light & Contrast will be attuned by inbuilt potentiometer.
- Via this I2C interface module, we may recognize data exhibit with just 2 wires.
- Comes with 2 IIC interface, which will be linked by DuPont wires or IIC dedicated wire.
- Companionable for 16*2 LCD.
- Backlight will be switched by aboard jumper.
- Dimension: 54*19 mm.



AVR ATmega 2560: This is a 8-bit microcontroller based on the AVR improved RISC structural design.

In this designed system ATmega2560 Microcontroller is employed.

Features

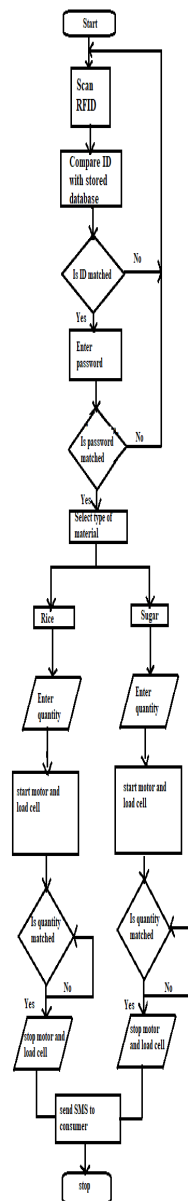
- High Performance, Low Power Atmel® AVR® 8-Bit Microcontroller
- Sophisticated RISC Architecture
- 135 Powerful Instructions
- Most Single Clock Cycle Execution
- 32 × 8 General Purpose Working Registers
- Up to 16 MIPS Throughput at 16MHz
- On-Chip 2-cycle Multiplier
- High Patience Non-volatile Memory Segments
- 64K/128K/256KBytes of In-System Self Programmable Flash
- 4Kbytes EEPROM
- 8Kbytes Internal SRAM



WORKING OF THE SYSTEM

The smart public allocation system supported RFID technology. As an alternative of ration card everybody will be

provided with an RFID card. If the consumer has to buy any ration material, he has to show the ration RFID tag to the RFID reader. The consumer will be having a unique number and the reader will identify it. The RFID number will be given to the microcontroller, which can compare the input number among the database. Once the consumer is identified, the microcontroller will check whether the consumer had already bought the ration item of to that month. If not, after that the ration item to be dispensed can be displayed on the LCD monitor. The consumer must enter the details of the item he needs to get. If consumer selects the ration item, the controller can calculate the cost of the items and check among the available cash money balance in the card. If the consumer has enough balance, after that microcontroller can begins the motor mechanism to dispense the items.



FLOW CHART OF THE SMART PUBLIC DISTRIBUTION SYSTEM

CONCLUSIONS

In ration shop many drawbacks are there such as material stealing, dishonesty, malpractices, long waiting time to gather

items, low processing speed. To defeat exceeding troubles the mechanized rationing scheme is considered necessary. Here the automatic ration shop concerned smart cards as well as controller for distribute the materials. At now ration card is alternated by smart card and also send the stock details to government head office by GSM module. Here all the facilities are completed automatically not including any manpower. Hence this planned system used to keep away from the dishonesty, goods thievery, fake and they reduce the consumer's waiting time. This system moreover recommended maintaining the stock details are correctly and updating the details are simply. They afford a secure, safe and efficient way of reasonable cost shops.

REFERENCES

1. *Suhas K, Suhas N, Sumukh B, Sunil S, A project report on Public distribution system guided by Mrs. S Mala, Department of Electronics and Communication, SIT Tumakuru 2015-16.*
2. *Sana A, Qader P, Dube R, Smart Card based e-Public Distribution System, International Journal of Advanced Research in Computer and Communication Engineering Vol. 5, Issue 5, May 2016.*
3. *Bhalekar D, Kulkarni R, Lawande K, Patil V, Online Ration Card System by using RFID and Biometrics International Journal of Advanced Research Computer Science and Software Engineering 5(10), pp. 849-851, October- 2015.*
4. *Ashok Kumar D, Ummal Sariba B, A Comparative Study on Fingerprint Matching Algorithms for EVM, Journal of Computer Sciences and Applications, Vol. 1, No. 4, pp:55-60,2013.*
5. *Sharath P, Prabhakar S, Jain A, On the individuality of fingerprints, IEEE Transactions on Pattern Analysis and Machine Intelligence, VOL. 24, NO. 8, pp: 1010-1025, 2002.*